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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
REDDY, KARUNA P				
ART UNIT		PAPER NUMBER		
1796				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

Office Action Summary

Application No.

10/586,134

Applicant(s)

MICHL ET AL.

Examiner

KARUNA P. REDDY

Art Unit

1796

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10, 11, 13-18 and 20-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10, 11, 13-18 and 20-27 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 2/19/2009 has been entered. Claims 1-9, 12 and 19 are cancelled; and claims 20-27 are added. Accordingly, claims 10-11, 13-18 and 20-27 are currently pending in the application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Objections

3. Claim 25 is objected to because of the following informalities: Claim 25 (line 11) recites "initiator.." and should read "initiator." Appropriate correction to the typographical error is required.

Claim Rejections - 35 USC § 112

4. Claims 10-11, 13-18, 20-25 and 27 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject

matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 10, 23 and 25 recite either "wherein the thermally polymerizable mixture does not comprise monomers other than the multifunctional macromonomer." or "thermally polymerizable consists essentially of" There is no support for these recitations in the originally filed disclosure. See discussion in paragraph 10 (A) below which is incorporated here by reference.

Claims 11, 13-18, 20-24 and 27 are subsumed by this rejection because of their dependence on either claim 10, 23 or 25.

Claim Rejections - 35 USC § 103

5. Claims 10-11, 13-14 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arkens et al (US 5, 661, 213).

Arkens et al disclose aqueous coating composition containing a polyacid and a polyol. The composition may be used as a binder for heat resistant nonwovens such as fiber glass (abstract). The addition polymer must contain at least two carboxylic acid groups such as (meth)acrylic acid, anhydride groups or salts thereof (column 4, lines 1-2) and read on the one or more free radically polymerizable double bonds. The addition polymer containing at least two carboxylic acid groups may have a molecular weight preferably from about 10,000 to 100,000 (column 4, lines 28-29). The polymerization reaction may be initiated by using the thermal decomposition of an initiator to generate free radicals to effect polymerization (column 5, lines 6-11). In one embodiment the carboxyl or anhydride-containing additional polymer, the polyol and the phosphorus-

containing accelerator may be present in the same addition polymer (column 7, lines 5-9). The curable aqueous composition may be used as a binder for heat resistant nonwoven fabrics such as certain polyester fibers, rayon fibers and glass fibers (column 8, lines 24-29). The water-borne formaldehyde-free composition after it is applied to a nonwoven is heated to affect drying and curing (column 8, lines 42-43). The heat resistant nonwovens may be used for applications such as insulation batts or rolls, as reinforcement scrim in cementitious and non-cementitious coatings for masonry (column 8, lines 61-67). The binder is used in amounts of 28% by weight based on the weight of glass i.e. glass fiber (column 10, lines 13-14).

Arkens et al fails to disclose contacting fibrous and/or granular substrates with polymerization reaction mixture; and impregnation of fibrous and/or granular substrate with thermally polymerizable mixture.

However, Arkens et al teach in the general disclosure use of curable aqueous composition as a binder for heat resistant nonwoven fabrics such as certain polyester fibers, rayon fibers and glass fibers and polymerization of the reaction mixture to form the addition polymer. Therefore, it would have been obvious to coat the substrate with polymerizable mixture of Arkens et al prior to polymerization, because Arkens et al teach coating a substrate such as certain polyester fibers, rayon fibers and glass fibers, as well as the polymerization of binder material and one of ordinary skill in the art would expect polymerization to work after coating the substrate with polymerizable mixture. Court held that selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

With respect to impregnation of substrate with thermally polymerizable mixture, it is the examiner's position that impregnation of substrate with thermally polymerizable mixture in amounts of from 2 to 35% by weight and 5 to 25% by weight is dependent on adhesion desired and the fibrous and/or granular nature of substrate and is within the scope of one skilled in the art, absent evidence of unexpected results.

6. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arkens et al (US 5, 661, 213) in view of Rockrath et al (US 6, 835, 420 B1).

The discussion with respect to Arkens et al in paragraph 5 above is incorporated herein by reference. Furthermore, the composition can comprise a polyacid containing at least two carboxylic acid groups or the salts thereof and a highly reactive polyol containing at least two hydroxyl groups wherein the ratio of the number of equivalents of said carboxylic groups, anhydride groups or salts thereof to the number of equivalents of said hydroxyl groups is from about 1/0.01 to about 1/3 (column 7, lines 18-26) and reads on the percentages of claim 15. The polymerization reaction to prepare addition polymer may be initiated by thermal decomposition of an initiator (column 5, lines 6-8).

Arkens et al is silent with respect to reacting the product obtained with at least one epoxy compound and subsequently reacting with polyisocyanate; and the polymerization initiator.

However, Rockrath et al teach binding agent comprising two functional groups which can enter into crosslinking reactions with complimentary functional groups in crosslinking agent (abstract). For thermally sensitive substrates it is advantageous to choose a temperature range which does not exceed 100°C. In view of these temperature conditions, hydroxyl groups and isocyanate groups or carboxyl and epoxy

groups have proven advantageous as complimentary functional groups (column 8, lines 54-59). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add polyisocyanate as a crosslinking agent to the binder of Arkens et al after reacting with epoxy crosslinker because the binder of Arkens et al comprises both carboxyl and hydroxyl groups and Rockrath et al have proven successfully that carboxyl and epoxy or hydroxyl and isocyanate are advantageous as complimentary functional groups in the binder for curing at low temperatures and one of ordinary skill in the art would expect such crosslinkers to work for the binder of Arkens et al, motivated by expectation of success.

With respect to polymerization initiator, Rockrath et al further teach that, as copolymerization initiator it is preferred to use initiators which form free radicals such as dialkyl peroxides, azobisisobutyronitrile and others (column 10, lines 66-67; column 11, lines 1-12). The strength and amount of initiator are customarily chosen in such a way that the supply of free radicals is constant. Therefore, it would have been obvious to one skilled in the art at the time of invention to use the free radical initiators of Rockrath et al in an amount (as in present claims) that provides constant supply of free radicals during polymerization because Arkens et al contemplate using thermal initiator, known in the art, during polymerization of addition polymer and Rockrath provides list of thermal initiators that can be used in amounts that generate constant supply of free radicals during polymerization, motivated by expectation of success.

7. Claim 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al (US 5, 096, 938) as evidenced by Fujioka et al (JP 60-163914).

Beck et al disclose a radiation curable catalyst by reacting a) 1 equivalent of a dihydric to hexahydric oxyalkylated C_2 - C_{10} alcohol with b) from 0.05 to 1 equivalent of a dibasic to tetrabasic C_3 - C_{36} carboxylic acid or its anhydride and c) from 0.1 to 1.5 equivalents of acrylic acid and/or methacrylic acid and reacting the excess carboxyl groups with an equivalent amount of epoxide compound (abstract). To avoid premature polymerization, the esterification is advantageously carried in the presence of small amounts of inhibitors (column 2, lines 66-68). It is noted that, phenothiazine listed as a polymerization inhibitor is known to function as polymerization initiator as evidenced by the teachings of Fujioka et al (abstract). After esterification, carboxyl groups of the acrylate resin and the excess acrylic acid or methacrylic acid are reacted with epoxide compounds (column 3, lines 14-21).

Beck et al is silent with respect to the use of coating composition on fibrous or granular substrates.

However, Beck et al's binder is generic to all coatings. Furthermore, for economical processability, in general low raw material and high reactivity are important with regard to the binder (column 1, lines 26-27), and a low requirement of reactive diluent for obtaining suitable processing viscosities (column 1, lines 26-30). The object is to provide coating materials which have substantially lower contents of volatile and physiologically unacceptable acrylic compounds, whose requirement of reactive diluents is very low and which can be processed to give high quality coatings (column 1, lines 60-66). Therefore, it would have been obvious to esterify the reaction mixture after coating the substrate such as fibrous and/or granular substrates, because Beck et al teaches both esterification and generic use of the product as a binder in coatings comprising low

content of volatile and physiologically unacceptable acrylic compounds, with suitable processing viscosities that can be processed to give high quality coatings.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al (US 5, 096, 938) in view of Rockrath et al (US 6, 835, 420 B1).

The discussion with respect to Beck et al in paragraph 7 above is incorporated here by reference.

Beck et al differs in further reacting the multifunctional macromonomer with a polyisocyanate.

However, Rockrath et al teach binding agent comprising two functional groups which can enter into crosslinking reactions with complimentary functional groups in crosslinking agent (abstract). For thermally sensitive substrates it is advantageous to choose a temperature range which does not exceed 100°C. In view of these temperature conditions, hydroxyl groups and isocyanate groups or carboxyl and epoxy groups have proven advantageous as complimentary functional groups (column 8, lines 54-59). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add polyisocyanate as a crosslinking agent to the binder of Beck et al because the binder of Beck et al comprises hydroxyl groups in addition to carboxyl groups and Rockrath et al have proven successfully that hydroxyl and isocyanate are advantageous as complimentary functional groups in the binder for curing at low temperatures and one of ordinary skill in the art would expect such crosslinkers to work for the composition of Beck et al, motivated by expectation of success.

9. Claims 10-11, 13-14, 17-18 and 20-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rockrath et al (WO 01/12736).

It is noted that WO 01/12736 (WO) is being utilized for date purposes. However, the US equivalent for WO, namely, Rockrath et al (US 6, 835, 420 B1) is referred to in the body of rejection below. All column and line citations are to the US equivalent.

Rockrath et al disclose a binding agent comprising two functional groups which can enter into crosslinking reactions with complimentary functional groups in crosslinking agent. The binding agent contains in an integrally polymerized form, at least one olefinically unsaturated polysiloxane macromonomer which contains at least 3.0 double bonds per molecule (abstract). Examples of suitable binders include acrylate copolymers (column 9, lines 12-15). Preferred acrylate copolymers (column 9, line 28) prepared by polymerizing polysiloxane macromonomer i.e. m3 (column 9, line 38) have a number average molecular weight of from 1500 to 10,000 (column 9, lines 48-49) and reads on the molecular weight of multifunctional macromonomer of present claims. The olefinically unsaturated double bonds of the polysiloxane macromonomers for inventive use are present in acrylic, methacrylic, vinyl, and/or allyl groups (column 7, lines 21-22). The monomer mixture is polymerized with one or more polymerization initiators (column 10, lines 61-63) and includes dialkyl peroxides, t-butyl perethylhexanoate and azobisisobutyronitrile (column 11, lines 5-11). Suitable substrates include fiber composites, glass fibers and rock wool (column 19, lines 33-40). See example 1, wherein the coating composition comprises hexaacrylate-functional polysiloxane macromonomer in the monomer mixture and initiator solution of t-butyl perethylhexanoate in amount of about 2% by weight relative to the monomer content (column 24, lines 16-44). Binder contains on average more than 3.0 double bonds per

molecule, a fraction of up to 15% by weight and preferably up to 2% by weight, based on the binder (column 7, lines 59-63) and reads on double bond content. The polymerization takes place at temperatures between 100 and 160°C (column 10, lines 64-65). Higher crosslinking temperatures may be employed and include temperatures of from 100°C to 180°C (column 8, lines 66-67).

Rockrath et al differ with respect to polymerizing the polymerizable mixture prior to contacting the substrate; and impregnating the substrate with thermally polymerizable mixture.

However, court held that selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946). Therefore, it would have been obvious to coat i.e. contact the substrate with polymerizable mixture prior to polymerization, instead of contacting the substrate after polymerization of polymerizable mixture, absent evidence of unexpected results.

With respect to impregnation of substrate with thermally polymerizable mixture, it is the examiner's position that impregnation of substrate with thermally polymerizable mixture in amounts of from 2 to 35% by weight and 5 to 25% by weight is dependent on adhesion desired and the fibrous and/or granular nature of substrate and is within the scope of one skilled in the art, absent evidence of unexpected results.

Response to Arguments

10. Applicant's arguments filed 2/19/2009 have been fully considered but they are not persuasive. Specifically, applicant argues that (A) there is support for recitation of

transitional phrases encompassing the broad spectrum of either "thermally polymerizable mixture comprising", or "thermally polymerizable mixture consists of" or "thermally polymerizable mixture consisting essentially of" in the originally filed claims or specification; (B) Arken's polyacid prepolymer does not comprise at least one ethylenically unsaturated double bond and there is no teaching that it retains at least one polymerizable double bond; (C) applicant's method excludes the polyol monomer Arken's includes in its curable compositions for reaction with polyacid prepolymer macromonomer; (D) Beck does not suggest that the radiation curable acrylates are thermally polymerizable and are capable of being thermally cured; (E) examiner erred in finding that Beck's binder is generic to all coatings; (F) Rockrath's fibrous substrates are fiber composites or fiber-reinforced plastics and are not the fibrous substrates of present invention; (G) Applicant's specification teaches that fibrous substrates may be penetrated by its thermally polymerizable mixtures, while Rockrath teaches that its thermally cured coating has a dry film thickness of from 10 100 microns; (H) Rockrath teaches that at least one binder contains in copolymerized form (emphasis added by applicant) at least one olefinically unsaturated polysiloxane macromonomer containing on average per molecule at least 3.0 double bonds i.e. macromonomer of Rockrath no longer comprises at least one free-radically polymerizable group; (I) If at least one of the functional groups of Rockrath's binder has ethylenically unsaturated double bonds available for crosslinking, then Rockrath's crosslinking agent must also contain complementary unsaturated double bonds available for crosslinking. Present claims exclude monomers other than multifunctional macromonomer.

With respect to (A), firstly, while the original claim used the transitional phrase "consisting of" to describe the thermally polymerizable mixture, it used the transitional

phrase "comprising" to describe the multifunctional macromonomer. Thus, it is the examiner's position that thermally polymerizable mixture is closed to components other than multifunctional macromonomer and radical polymerization initiator, but the multifunctional macromonomer is open to monomer components other than those listed in the claim 10. Specifically, claim 10 recites "multifunctional macromonomer comprises at least one free-radically polymerizable group". In fact, multifunctional macromonomer of claim 15 can be prepared by reacting with a diol and does not have to be a free-radically polymerizable group listed in independent claim 10 on which claim 15 is dependent. Thus, it is the examiner's position that present claims only require that multifunctional macromonomer comprise at least one free-radically polymerizable group and does not exclude other monomer components.

Secondly, the present claim 10 recites "thermally polymerizable mixture comprises a multifunctional monomer and a radical polymerization initiator". The term "comprising" to describe the thermally polymerizable mixture was introduced in the amendment filed 11/8/2007. Applicant's arguments filed on 11/8/2007 indicated that claim 10 as amended found support in the originally filed claims and specification. Examiner looked to the specification and found that thermally polymerizable mixture can further comprise other components and disclosure "for example" indicates to one skilled in the art that the thermally polymerizable mixture can contain components other than those listed (page 7, lines 4-10) since the list is just an example. Further, there is no teaching that thermally polymerizable mixture can contain, in addition to the multifunctional macromonomers and radical polymerization initiator, only those components which do not materially affect the basic and novel characteristics of the claimed method.

In short, there is no support for a thermally polymerizable mixture comprising a multifunctional macromonomer and a radically polymerizable mixture but excluding other monomers while being open to components other than monomers which are excluded. Also, there is no support for recitation that the thermally polymerizable composition "consists essentially of" multifunctional macromonomer and radical polymerization initiator, in the originally filed specification or claims.

With respect to (B), applicant's attention is drawn to Arkens et al (column 4, lines 1-8) wherein it discloses that addition polymer must contain ethylenically unsaturated carboxylic acid and anhydride groups. Thus, it is clear that monomers used in Arkens et al contain at least one polymerizable double bond.

With respect to (C), firstly, dependent claim 15 which includes diol as a component to prepare the multifunctional macromonomer does not have to contain a free radically polymerizable double bond. Secondly, independent claim 10 recites that multifunctional macromonomer comprises at least one free-radically polymerizable group i.e. it requires at least one free-radically polymerizable group and can contain other components including the polyol of Arkens et al.

With respect to (D), given that the monomers used to prepare polymers of Beck et al contain substantially similar monomers, it is the examiner's position that monomer mixture of Beck et al is thermally polymerizable. Furthermore, recitation "polymerizing the thermally polymerizable mixture" is open to radiation as well as thermal polymerization because it only requires that the mixture be thermally polymerizable.

With respect to (E), applicant's attention is drawn to Beck et al (abstract) where it states that radiation curable acrylates are used in coating materials. Thus, it is the

examiner's position that Beck's binder is generic to all coatings and does not teach away from using it on fibrous and/or granular substrates.

With respect to (F), firstly, the fibrous substrates of present claims are not restricted to a particular kind of fibrous substrates. Secondly, applicant's attention is drawn to Rockrath et al (column 19, lines 33-40) where it states that suitable substrates include textile, glass fibers, and rock wool. Similarly present specification (page 7, lines 13-16) also discloses that suitable substrates include natural fibers such as cotton i.e. textile, glass fibers and rock wool.

With respect to (G), the examined claims did not require fibrous and/or granular substrates to be penetrated or impregnated by its thermally polymerizable mixture. It only required contacting the substrate with a thermally polymerizable mixture. For present amendments, applicant's attention is drawn to the new grounds of rejection in paragraphs 5-9 set forth above and is necessitated by amendment.

With respect to (H), applicant's attention is drawn to the teaching, in Rockrath, that binder contains in copolymerized form at least one olefinically unsaturated polysiloxane macromonomer containing on average per molecule at least 3.0 double bonds. Further, evidence that the double bonds are available comes from Rockrath (column 7, lines 59-63) wherein it states "owing to their high functionality of on average more than 3.0 double bonds per molecule". Thus, it is the examiner's position that macromonomer of Rockrath contains at least 3.0 double bonds i.e. contains thermally free-radically polymerizable groups.

With respect to (I), applicant's attention is drawn to Rockrath (column 8, lines 6-65) wherein it states that suitable complementary reactive functional groups in

crosslinking agents include isocyanates and epoxy for hydroxyl and carboxyl groups respectively i.e. crosslinking agents do not necessarily have to contain double bonds.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARUNA P. REDDY whose telephone number is (571)272-6566. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. P. R./
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796